



Frequently Asked Questions: Reducing Incidence of Sanitary Sewer Overflows

Sanitary Sewer Overflows (SSOs) have a variety of causes. In addition, the impacts of SSOs vary, depending on the timing, duration, volume of wastewater flows and whether the public or surface water is exposed to the SSO.

What are sanitary sewers?

Sanitary sewers are the underground pipes that carry the flow of wastewater from all buildings, including our homes, businesses, schools, churches and government agencies, to a wastewater treatment plant. In most areas, sanitary sewers carry domestic and commercial wastewater and are independent of storm drains, which carry the runoff from rainfall. As they collect and transport water, sanitary sewer systems are also called “collection systems.”

How do Bay Area sanitary sewer systems work?

Sewer service laterals carry wastewater from each house or building to a sewer pipe under the street. These sanitary sewer pipes are called “mains” and the wastewater flows through these pipes into progressively larger pipes, which carry more and more wastewater and ultimately reach the wastewater treatment plant. Even though most wastewater treatment plants are located in low-lying areas and sewage flows by gravity to get there, sewer systems also include pumps or lift stations if it is necessary to move wastewater uphill on its way to the treatment plant.



Wastewater agencies in the Bay Area are spending millions of dollars each year to prevent sanitary sewer overflows.

What is a sanitary sewer overflow (SSO)?

A sanitary sewer overflow (SSO) is an unintentional release of sewage from a sanitary sewer into the environment.

Why are SSOs a concern?

The simple fact that wastewater is out of the pipe concerns all of us because it has the potential to impact public health and the water environment. Most SSOs are small and clean-up crews are able to recover the released wastewater before any people have contact or before it reaches a body of water. However, periodically a large overflow occurs and recovery and clean-up can be more involved, particularly if the overflow reaches a body of water. In these less

common situations, the overflow has the potential to temporarily affect aquatic life and, if the wastewater reaches a water body used for recreation, local agencies will notify the public that access should be restricted temporarily until there is no more risk to public health. SSOs also can cause private property damage if they occur along private sewer service laterals and domestic wastewater backs up in the building or releases outside above ground.

What causes sanitary sewer overflows?

SSOs occasionally occur in almost every sewer system for a variety of reasons, including the following:

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| Blockages | Grease build-up and debris are the most common cause of SSOs in the Bay Area because these obstacles either block flow in the sewer (grease build-up and debris) or create cracks and leaks in the sewer. While they don't always result in overflows, wastewater flow in a blocked sewer pipe will find the easiest point of relief. Sometimes the point of relief is a sewer lateral in which sewage travels back up into the connected building, like a home or business. As such, some local sewer authorities require that homes and businesses install a backflow prevention device. |
| Infrastructure failure | Sections of pipe can settle or shift so that pipe joints no longer match, leading to leaks and/or blockage. Broken or cracked pipes also allow for leaks in the pipes. Power or equipment failures can also prevent the system from functioning properly. |
| Infiltration and inflow (I/I) | During rainstorms or periods of continual wet weather, groundwater can infiltrate into sanitary sewers that have cracks or other structural deficiencies, potentially leading to system overload. Excess water also can inflow through roof or patio drains illegally connected to sewers, through broken or poorly connected sewer service laterals, or cracks in the sewer access holes in the street (i.e., manholes). I/I tends to increase as sewer systems age. To put this issue in perspective, some Bay Area communities rely on sewer system segments that were built 100 years ago. |

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| Capacity limitations | Pipes and pumps may be too small to accommodate all infiltration and inflow during large or successive storm events. To prevent overflows, most pipes are sized to provide some capacity during wet weather, but a sewer's capacity can be limited as a result of pipe failure, blockages, and/or growth in the service area that has taken up any wet weather capacity with regular dry weather wastewater flow. |
| Vandalism | Vandals open manhole covers and throw in wood, rocks, or other debris, which causes blockages. |
| Plumbers | When a plumber clears a homeowner's blocked private sewer service lateral, sometimes the debris becomes lodged in the sewer main downstream of the lateral. Plumbers' equipment also has been known to break during a repair and lodge in the main line. |
| Extreme storm events | During an extreme storm event the integrity and capacity of sewer pipes are tested. Sewer collection systems typically experience increased flows during wet weather, which may exceed the design capacity, as capacity is based on a specific size of storm event that happens more frequently than an extreme storm event. For example, a sewer collection system may be designed for a 10-year storm event, but a 50-year storm event would cause an overflow because there is insufficient capacity in the pipes to carry the increased wastewater flow generated during the extreme storm event. |

How are agencies currently preventing SSOs?

Sewer collection systems are publicly owned and operated by public clean water agencies such as cities or special districts that are focused on protecting the public health and the environment. These clean water agencies employ trained and dedicated personnel to maintain the collection system. Well-managed collection systems receive thorough assessment of the condition, capacity and reliability of the entire system, including pipelines and pump stations. The results of the condition assessment are incorporated into a long-term capital plan, which includes annual repairs or replacements. Clean water agencies also regularly clean pipes, inspect the condition of local sewer systems using underground video equipment and prioritize needed repairs and replacements. Clean water agencies conduct programs to educate customers and plumbers about activities that can cause SSOs as well as encourage immediate reporting of potential or suspected overflows.

Who has jurisdiction over Bay Area sewer systems and wastewater treatment plants?

There are about 48 publicly owned wastewater treatment plants in the Bay Area that accept wastewater from sanitary sewers.¹

1) San Francisco Bay Regional Water Quality Control Board.

2) State Water Resources Control Board Order No. 2006-0003-DWQ.

BACWA "No SSOs" Outreach Programs

BACWA and the Bay Area Pollution Prevention Group (BAPPG) are leading the way in educating food service facilities and homeowners on how to prevent SSOs caused by Fats, Oils and Grease (FOG) with a robust outreach program including advertising, educational materials, workshops and distribution of more than 50,000 commercial-grade scrapers to food service facility staff (used to dispose of FOG in the trash, versus down a drain). BACWA also is working with water agencies to educate plumbers about preventing SSOs.

For more information about these BACWA-sponsored programs, visit www.baywise.org.

The majority of clean water agencies that own and operate treatment plants also own and operate at least a portion, if not all, of the collection/sanitary sewer systems that flow to the treatment plant. However, there are sewer systems that are owned and operated by separate public clean water agencies, often referred to as "satellite collection systems/agencies." There are about 70 of these public satellite collection system agencies in the Bay Area and each agency is responsible for the management of its own system. In other words, wastewater treatment plant operators do not have jurisdiction over satellite agencies. For example, The City of Berkeley owns and maintains its own sewer system, but conveys wastewater to the East Bay Municipal Utility District's (EBMUD) treatment plant for treatment and disposal.

How are SSOs regulated?

In 2006, the State Water Resources Control Board adopted general requirements for clean water agencies that own and operate collection systems.² The state requires that each clean water agency prepare a Sanitary Sewer Management Plan (SSMP) describing system-specific protocols for management, operations, maintenance, capacity improvements and spill prevention and response. The purpose of these plans is to prevent SSOs and enable clean water agencies to respond quickly when SSOs occur. In the San Francisco Bay Area, SSMPs were under development more than a year before the state requirements were adopted. If there is an SSO from a publicly owned sewer pipe that flows into a drainage channel or surface water, the clean water agency that owns the pipes must notify regulatory agencies, including the Regional Water Quality Control Board, the Office of Emergency Services and the local health department within two hours.

About BACWA

BACWA is a public joint powers authority whose members include public utilities that collect and treat municipal wastewater in the nine counties that surround the San Francisco Bay. BACWA is dedicated to working with our member agencies, the state and federal governments, as well as non-governmental organizations to deliver useful information about the water quality of the San Francisco Bay. BACWA works to ensure that water quality information is fully utilized to determine the health and needed protection of the San Francisco Bay. BACWA supports its public utility members, the public clean water agencies of the San Francisco Bay region, to promote understanding of the water quality needs and requirements of the region and to make water quality protection and enhancement a priority in our communities. For more information, visit www.bacwa.org.

NOTE: The information used in this document was adapted by the City of Mountain View from BACWA materials.